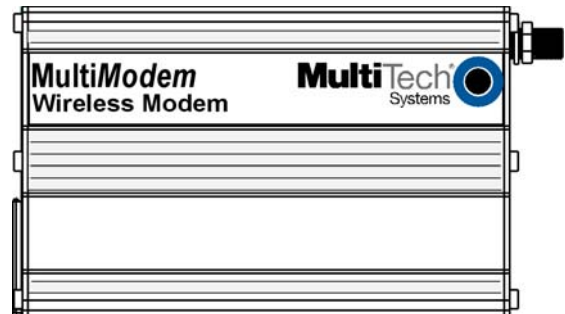# MultiModem® GPRS

USB Wireless Modem

MTCBA-G-U-F4

User Guide

MultiModem® GPRS
USB Wireless Modem
User Guide
Model MTCBA-G-U-F4
S000444D, Revision D

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Revision History

Revision	Date	Description
A	10/04/07	Initial Release
B	03/20/08	Added Vista Operating System support. Added section on changing the GPRS Band.
C	11/17/08	Updated Vista Driver installation, added Windows Server 2008 installation, removed fax requirement, and minor editorial changes
D	06/21/2011	Removed references to product CD.

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Warranty

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Contents

Chapter 1 – Product Description and Specifications

Product Description

The Multi-Tech MultiModem GPRS is an external data/fax/voice wireless modem with a USB interface. It supports mobile originated short message service (SMS) and mobile-terminated SMS. Designed for global use, it offers standards-based quad-band GSM/GPRS Class 10 performance. This ready-to-deploy, standalone modem allows developers to add wireless communication to products with a minimum of development time and expense. The MultiModem GPRS is based on industry-standard open interfaces, is fully type approved, and can be desktop or panel mounted.

Features

- GPRS Class 10 operation
- Quad-band 850/900/1800/1900 MHz
- GSM Class 1 and Class 2
- Desktop or panel mounting
- Short Message Services including text and PDU, point-to-point, cell broadcast
- 14.4K GSM circuit switched data
- SMA antenna connector and SIM socket
- Serial interface supports DTE speeds to 115.2K
- AT command compatible
- MNP2 V.42bis data compression
- Numerous LEDs provide operational status
- ME + SIM phone book management
- Fixed dialing number
- SIM Toolkit Class 2
- SIM, network and service provider locks
- Real time clock
- Alarm management
- UCS2 character set management
- Packet data up to 85K bps
- Embedded TCP/IP stack

Safety

General Safety

The modem is designed for and intended to be used in fixed and mobile applications. "Fixed" means that the device is physically secured at one location and is not able to be easily moved to another location. "Mobile" means that the device is designed to be used in other than fixed locations.

Caution: Maintain a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter's antenna and the body of the user or nearby persons. The Modem is not designed for or intended to be used in portable applications within 20 cm. (8 inches) of the body of the user.

RF Interference Issues

Follow all special regulations regarding the use of radio equipment due to the possibility of radio frequency (RF) interference. Adhere to the following safety advice:

- Switch off your wireless MultiModem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both.

- Switch off your wireless MultiModem when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.

- Switch off your wireless MultiModem in hospitals and any other place where medical equipment may be in use.

- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.

- There may be a hazard associated with the operation of your wireless MultiModem close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.

- Operation of your wireless MultiModem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.

Vehicle Safety

- Do not use your MultiModem while driving.

- Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.

- If incorrectly installed in a vehicle, the operation of the MultiModem could interfere with the correct functioning of vehicle electronics. To avoid such problems, be sure that qualified personnel install the modem. Verification of the protection of vehicle electronics should be part of the installation.

- The use of an alert device to operate a vehicle's lights or horn on public roads is not permitted.

Maintaining the Modem

Treat your wireless MultiModem with care. The suggestions below will help you enjoy this product for many years.

- Do not expose the wireless MultiModem to any extreme environment where the temperature is above 50ºC or humidity is above 90% noncondensing.

- Do not attempt to disassemble the wireless MultiModem. There are no user serviceable parts inside.

- Do not expose the wireless MultiModem to water, rain, or spilled beverages. It is not waterproof.

- Do not place the wireless MultiModem alongside computer discs, credit or travel cards, or other magnetic media. The phone may affect the information contained on discs or cards.

- The use of accessories not authorized by Multi-Tech or not compliant with Multi-Tech's accessory specifications may invalidate the warranty of the wireless MultiModem.

- In the unlikely event of a fault in the wireless MultiModem, contact Multi-Tech Tech Support.

- Keep the modem in a safe place and out of the reach of children.

- Try to remember your Unlock and PIN codes. Use the security features to block unauthorized use and theft.

Package Contents

Unbundled Package Modem with No Accessories	Bundled Package Modem with Accessories
1 modem 1 mounting bracket 1 Quick Start Guide Note: You must supply a USB cable, bracket screws, and an antenna.	1 modem 1 mounting bracket 1 USB cable 1 antenna 4 rubber feet 1 Quick Start Guide Note: You must supply bracket screws.

SIM Chip

Your wireless service provider will supply the Subscriber Identity Module (SIM) configuration chip. The SIM contains information specific to your wireless account and its features.

General Specifications

General Specifications	
Mechanical Dimensions & Weight	4.3" L x 2.4" W x 0.94" H; 4.2 oz. (11 cm x 6.1 cm x 2.4 cm; 119 g)
Connectors & Fasteners	**Antenna Connection type**: SMA jack **Interface Connector:** USB Type B **Phone Handset**: Modular handset jack **SIM receptacle**: Standard 3V SIM receptacle
Operating Temperatures	-40° to +85°C
Storage Temperatures	-40° to +85°C
Humidity	Relative humidity 20% to 90% noncondensing
Certifications and Safety	**CE Mark, R&TTE** **EMC:** FCC Part 2, 15, 22, 24, EN 55022 & EN 55024 **Safety:** cUL, UL 60950, EN 60950 **Network:** PTCRB

Functions – GSM/GPRS Modes

Mode	Description
Standard	Quad Band 850/900/1800/1900 MHz
Interface	USB interface. USB Type B.
SMS	Mobile Originated (MO) and Mobile Terminated (MT) SMS Mode Text & PDU point to point. Cell broadcast in accordance with GSM 07.05.
Data	Data circuit asynchronous, transparent, non-transparent up to 14,400 bits
GPRS	Class 10. Coding schemes: CS1 to CS4.

Electrical Specifications

Electrical Characteristics	
Switching on/off	The device is permanently powered when connected to the USB port.
Voltage	Voltage Range: 5 to 32V DC GND: 0V

Current Requirements			
Parameters	**GSM/GPRS 850/900**	**GSM/GPRS 1800/1900**	**Unit**
	Typ.	**Typ.**	
Input average supply current in comm. mode at P_{max}	360	300	mA
Input average supply current in idle mode	30	30	mA

RF Specifications

	GSM 850	EGSM 900	GSM 1800	GSM 1900
Frequency RX	869 to 894 MHz	925 to 960 MHz	1805 to 1800 MHz	1930 to 1990 MHz
Frequency TX	824 to 849 MHz	880 to 915 MHz	1710 to 1785 MHz	1850 to 1910 MHz
RF Power Stand	2W at 12.5% duty cycle	2W at 12.5% duty cycle	1W at 12.5% duty cycle	1W at 12.5% duty cycle

Antenna Specifications

GSM/EGSM Antenna Requirements/Specifications

Frequency Range:	824 – 960 MHz / 1710 – 1990 MHz
Impedance:	50 Ohms
VSWR:	<2.0:1
Typical Radiated Gain:	3 dBi on azimuth plane
Radiation:	Omni
Polarization:	Vertical
Wave:	Half Wave Dipole

Antennas Available from Multi-Tech Systems, Inc.

Description	Part Number
Hinged Right Angle 900/1800 MHz Cellular Modem Antenna	ANF1-1HRA
Hinged Right Angle 800/1900 MHz Cellular Modem Antenna	ANF2-1HRA
Hinged Right Angle 850/900/1800/1900 MHz Cellular Modem Antenna	ANQB-1HRA

PTCRB Requirements Note
There cannot be any alteration to the authorized antenna system. The antenna system must be the same type with similar in-band and out-of-ban radiation patterns and maintain the same specifications.

FCC Requirements Note
The antenna gain, including cable loss, must not exceed 3.0 dBi at 1900 MHz / 1.6 dBi at 850 MHz for mobile operating configurations and 7.0 dBi at 1900 MHz / 2.3 dBi at 850 MHz for fixed mounted operations, as defined in 2.1091 and 1.1307 of the rules for satisfying RF exposure compliance.

Interfaces

The wireless MultiModem has several interfaces:

- LED function indicating operating status
- External antenna (via SMA connector)
- Serial and control link (via USB connector)
- Microphone and speaker (via handset jack)
- SIM card holder

LED Interface

TD	**Transmit Data.** Lit when modem is transmitting data.
RD	**Receive Data.** Lit when modem is receiving data.
CD	**Carrier Detect.** Lit when data connection has been established.

LS	**Line Status.**
	
	    Continuous "on" state indicates that the wireless modem is not registered on the network.
	    Flashing state indicates registration on network.
	    Off state. Modem is off (not ready) or in download mode.

TR	**Terminal Ready.** Commonly called "Data Terminal Ready." This is a readiness signal from the PC.
PWR	**Power.** Indicates presence of DC power when lit.

AT Command Reference Guides

AT commands for the GPRS USB wireless modem are published in a separate GPRS AT Commands Reference Guide. You can find this guide on the Multi-Tech website.

Chapter 2 – Activation and Installation

Activating Your Wireless Account

Some Multi-Tech cellular modems have been pre-configured to operate on a specific cellular network, such as Sprint and Verizon Wireless.

However, before you can begin to use the modem, you must set up a cellular data account with your cellular network provider. Refer to Multi-Tech's Cellular Activation website http://www.multitech.com/activation.go for information on activating your cellular modem.

Phone Numbers for the Wireless Modem

Every wireless modem has a unique phone number. Your wireless provider may give you the phone number or the number might be on the SIM card. Wireless provider implementations may vary.

Inserting the SIM Card into the Holder

The wireless MultiModem requires a SIM card (Subscriber Identity Module) to operate on a GSM network. To install the card:

1. Use a small screwdriver or similar tool to pry off the SIM cover.
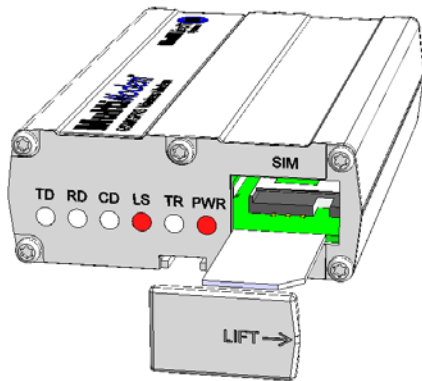
2. Insert the SIM card into the holder.

3. Verify that the SIM card fits into the holder properly and then replace the cover.

Connecting the Antenna and USB Cable

1. Connect a suitable antenna to the SMA connector (See antenna specifications in Chapter 1).

2. Connect the Series B end of the USB cable to the modem and the other end to the PC.

Connecting Phone Handset (Optional)

If you intend to use a phone handset, connect it to the MultiModem now.

Attaching the Modem to a Flat Surface (Optional)

To mount the wireless MultiModem:

1. Obtain mounting screws (two are needed) that are appropriate for the surface on which you will mount the MultiModem. For example, one might use two 6-32 self-tapping screws 5/8" in length to mount the unit in a truck to the wall of the cab behind the passenger's seat.

2. Typically, the unit is mounted against a flat surface into which holes can be drilled. The mounting holes (center-to-center) must be separated by 125 mm or 4 -15/16 inches.
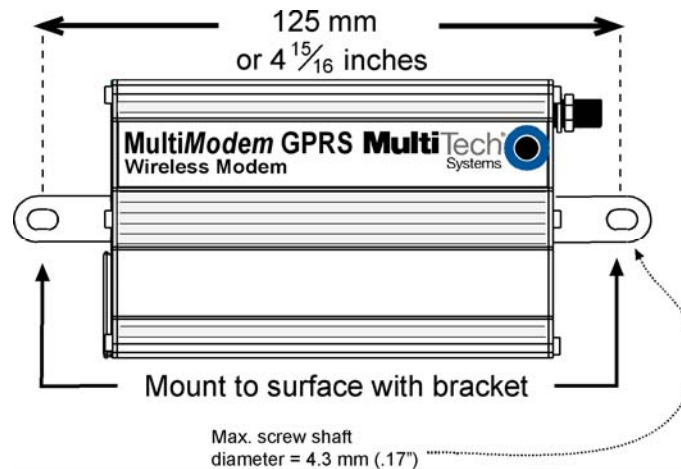
3. Drill the mounting holes at the desired mounting location (if applicable).

4. Slide the mounting brackets into the corresponding slots on the back of the MultiModem chassis.

5. Attach the MultiModem with two screws to the mounting surface at the desired location on the equipment.

Installing Modem Drivers

This section describes how to install modem drivers.

The wireless MultiModem is compatible with Windows Operating Systems Vista/XP/2003/2000 and Linux.

Obtaining Windows Drivers

You must install the wireless MultiModem USB driver in your computer's program directory. You can download the Windows USB drivers from the website:

www.multitech.com/setup/product.go

A complete set of drivers for each operating system is organized into Vista and XP with either 32-bit or 64-bit processor. For 64-bit operating systems, go to **Start I All Programs I Accessories I System Tools I Computer** and click on the **System Properties** button. Under **System** you will see **System Type: 64-bit Operating System**.

Obtaining Linux Drivers

You must download the Linux Operating System drivers from:

www.multitech.com/setup/product.go

Refer to the Readme file for the correct driver file and installation guide for your distribution/version of Linux.

Installing the Drivers for Windows Vista

This section describes how to install both the USB driver and the modem driver.

Before You Begin

1. Ensure you have downloaded the proper driver from the Multi-Tech website and stored the driver on your computer.

2. Power up your computer.

3. If you have not already done so, connect the modem's USB cable to a USB port on the computer.

4. Windows detects that the new modem is present.

Installing the Driver for your TUSB3410 Serial Port

To install the USB driver:

1. Complete the steps in the section Before You Begin.

2. The **Found New Hardware** window opens, indicating that Windows needs to install driver software for your TUSB3410 Serial Port.
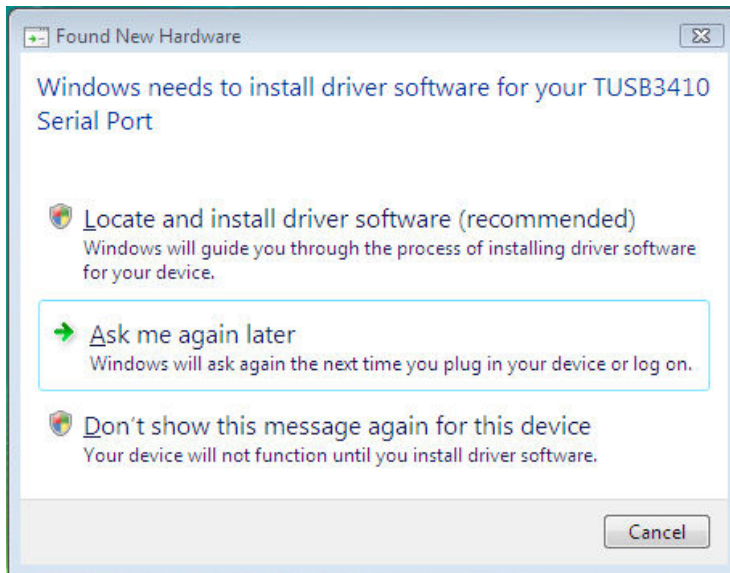
3. Click **Locate and install driver software (recommended)**. A Windows installation wizard guides you through the process of installing the driver.

4. On the next Wizard screen, click **I don't have the disc. Show me other options**.
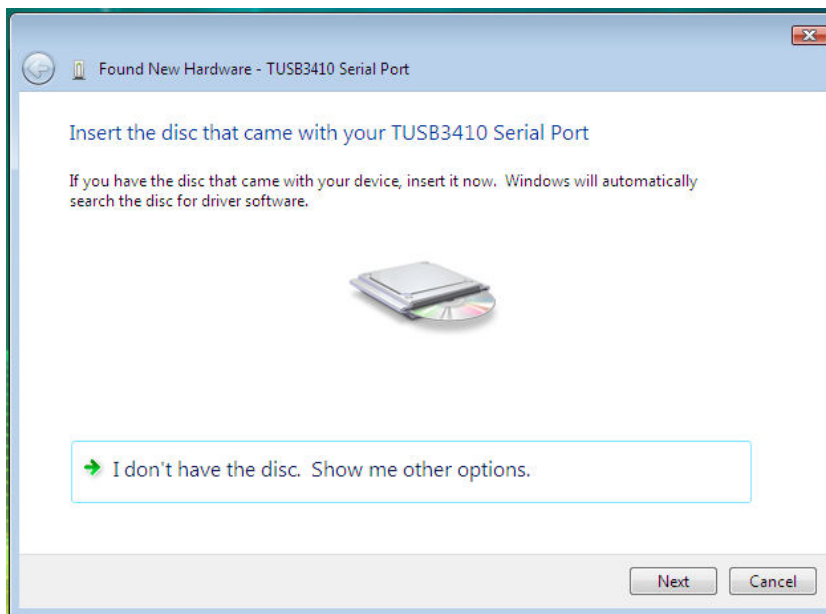
5. Select **Browse my computer for driver software (advanced)**.
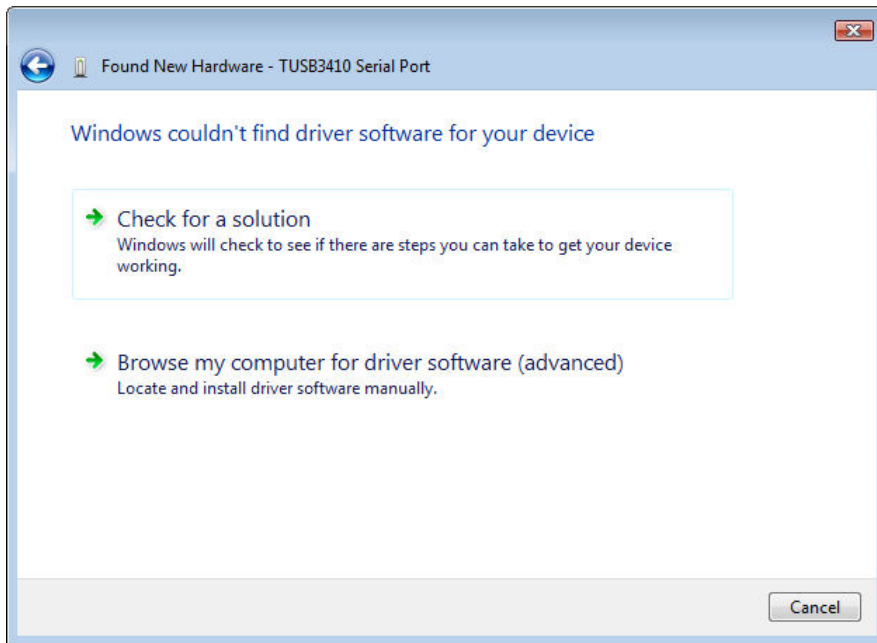
6. At the Browse for driver software on your computer wizard screen, click **Browse**.
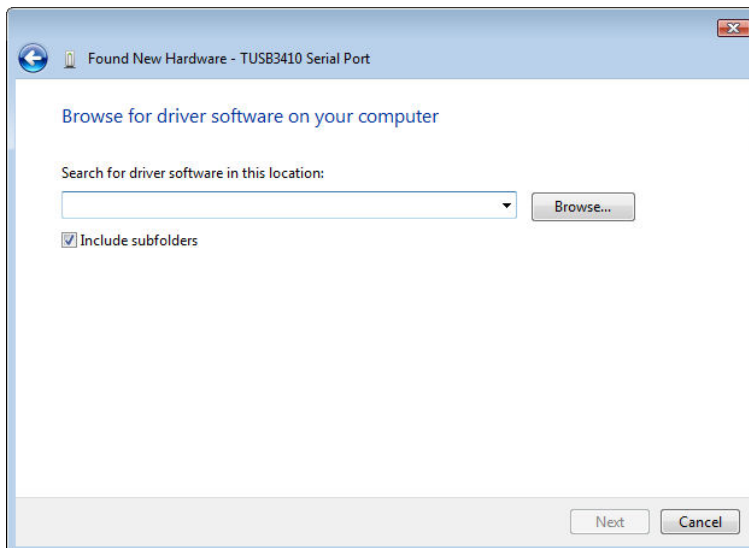
7. Browse to the **Drivers** folder on your computer where you stored the driver you downloaded. Then select one of the following:

- If installing on a 32-bit operating system, select the location of the Vista32 driver.

- If installing on a Vista 64-bit operating system, select the location of the Vista64 driver.
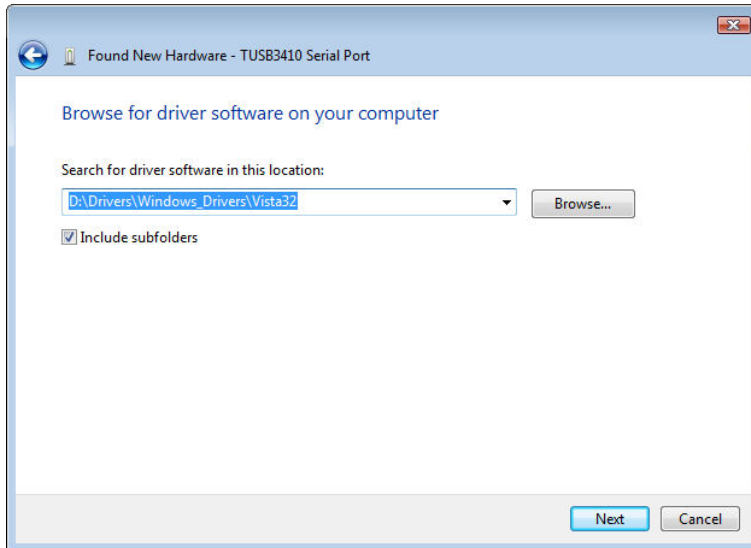
8. Click **Next**.

9. **Windows can't verify the publisher of this driver software** dialog box opens.
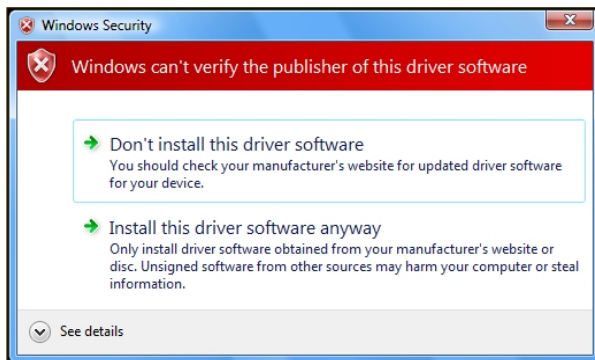
10. Select **Install this driver software anyway**.

11. The **Installing driver software…** wizard screen appears.
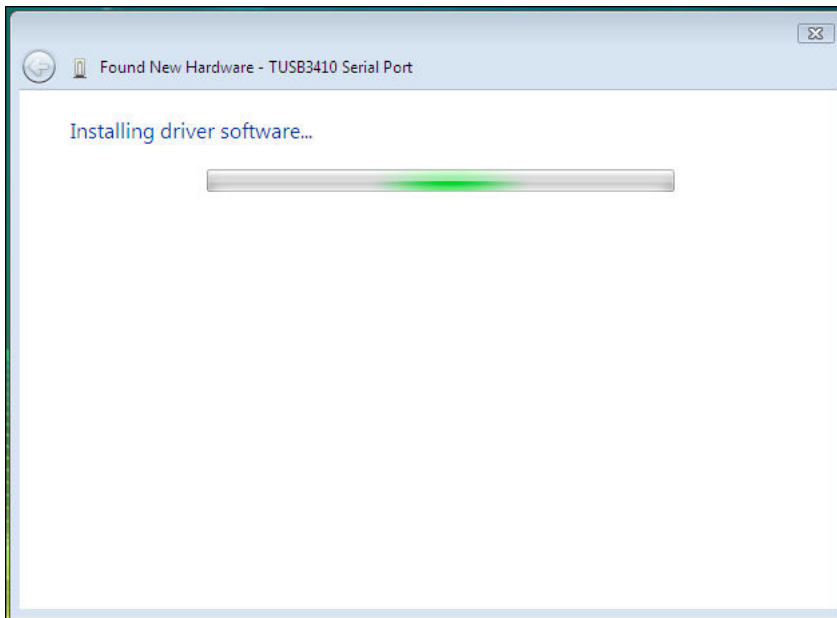
12. A window appears telling you that the software has been successfully installed.
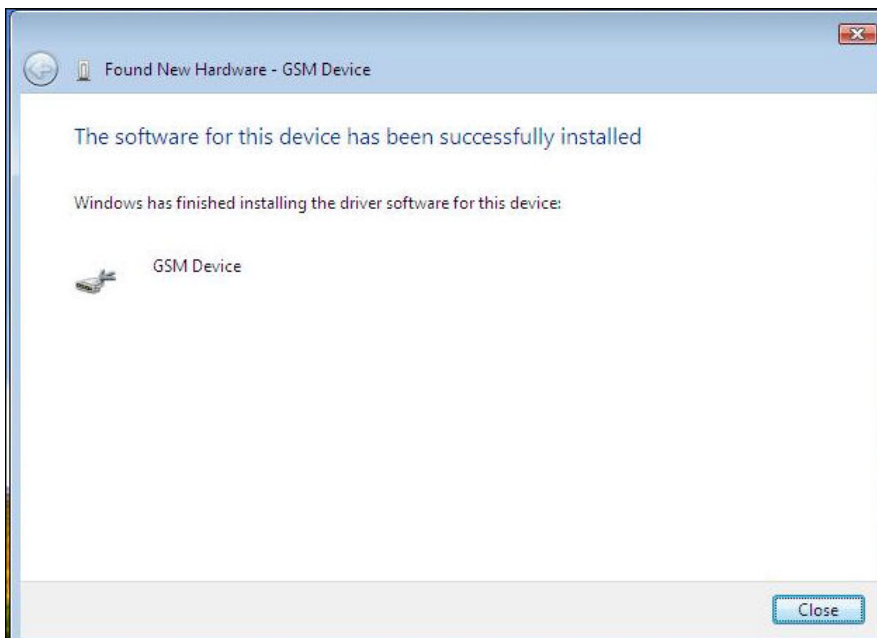
13. Click **Close.**

Installing the Modem Driver

To install the modem driver:

1. The **Found New Hardware – MultiTech GSM Modem** window appears.
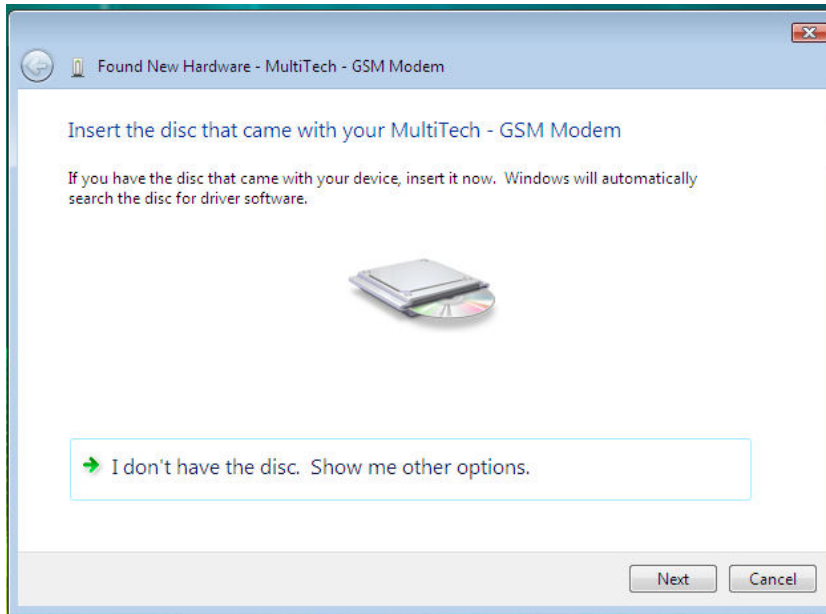
2. Click **I don't have the disc. Show me other options**. Click **Next**.

3. Click **Browse my computer for driver software (advanced)**.
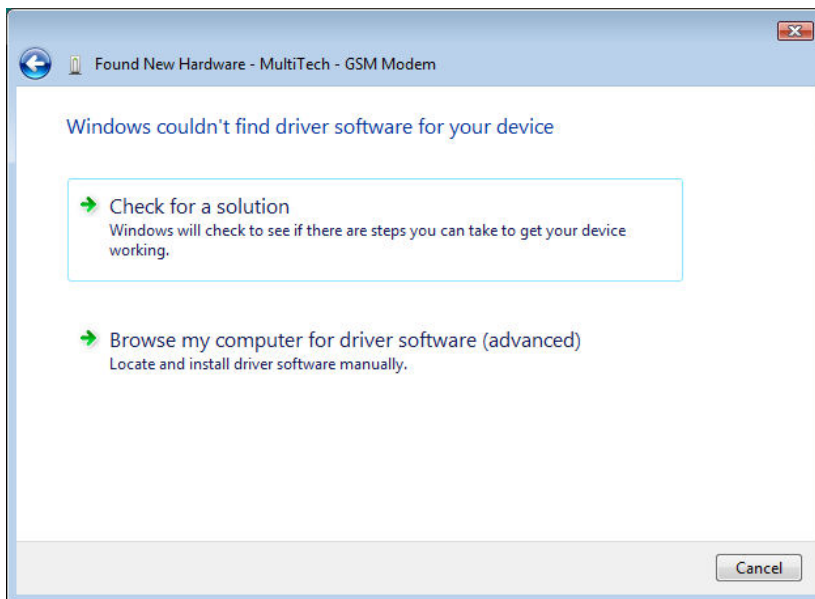
4. The dialog box "Windows can't verify the publisher of this driver software" appears.
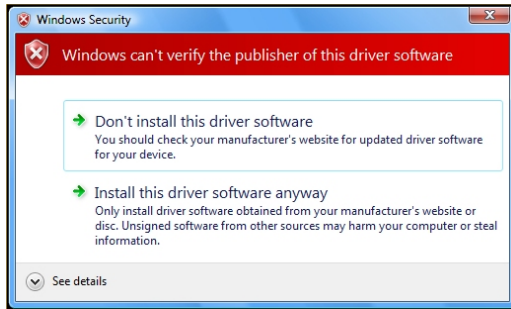
5. Select **Install this driver software anyway**. The Installing driver software progress window appears.

6. The software for this device has been successfully installed window appears. Windows has finished installing the driver software for this device: Multi-Tech Systems USB GSM_GPRS wireless Modem
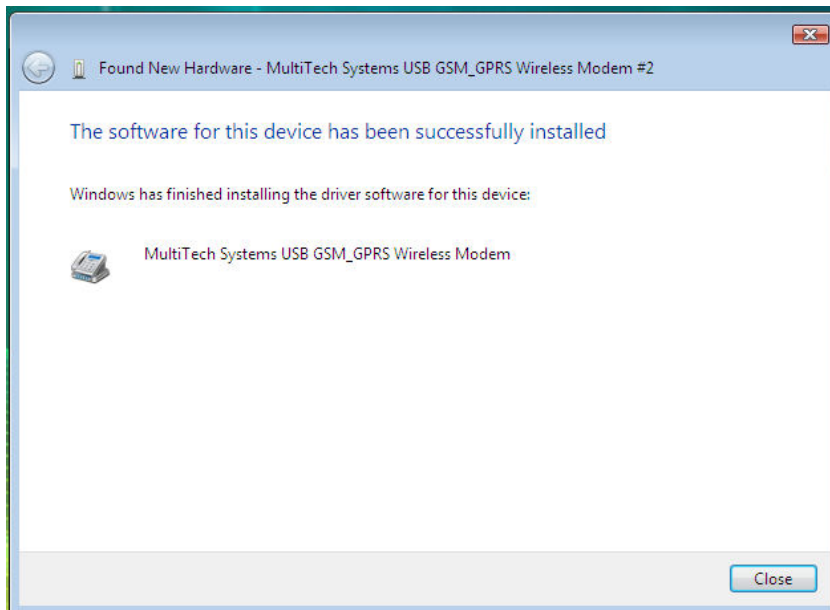
7. Click **Close**. The installation of drivers is now complete.

Installing the Drivers in Windows Server 2008, XP, 2003

This section describes how to install drivers for the operating systems Windows Server 2008, XP and 2003.

You need to install both a USB driver and a modem driver.

Installing the USB driver

To install the USB driver:

1. Connect the USB cable between the MultiModem and the PC.

2. In some situations the operating system displays a Found New Hardware Wizard window and asks: Can Windows connect to Windows Update to search for software?

    Select **No, not this time**. Then click **Next**.

3. The *Found New Hardware Wizard* window now displays the GSM Device.
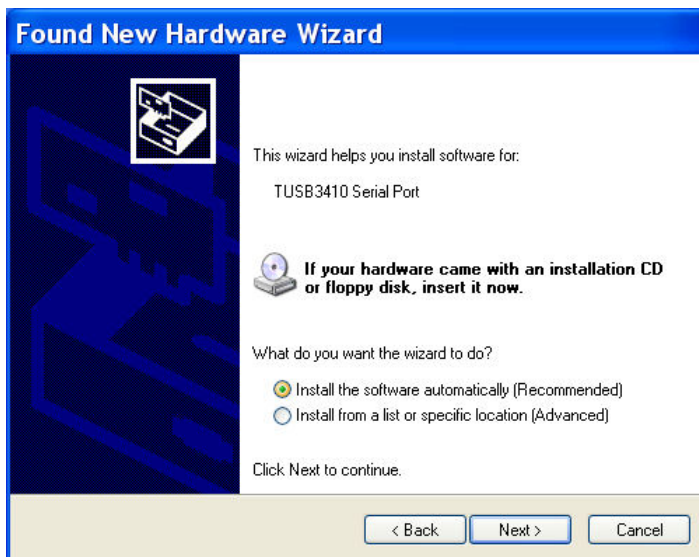
4. Select **Install from a list or specific location (Advanced)**, and then click **Next**.

5. The wizard screen Please choose your search and installation options opens. Ensure that only checkbox that is selected is **Include this location in the search.**
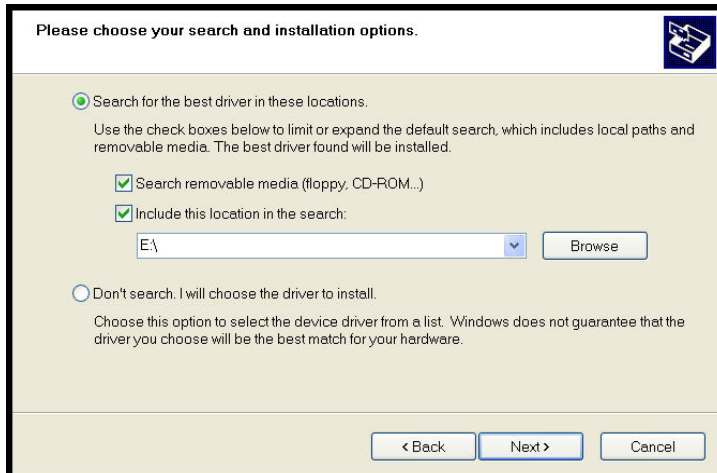
6. Browse to the **Drivers** folder on your computer where you stored the driver you downloaded. Then select one of the following:

- If installing on a 32-bit operating system, select the location of the Vista32 driver.

- If installing on a Vista 64-bit operating system, select the location of the Vista64 driver.
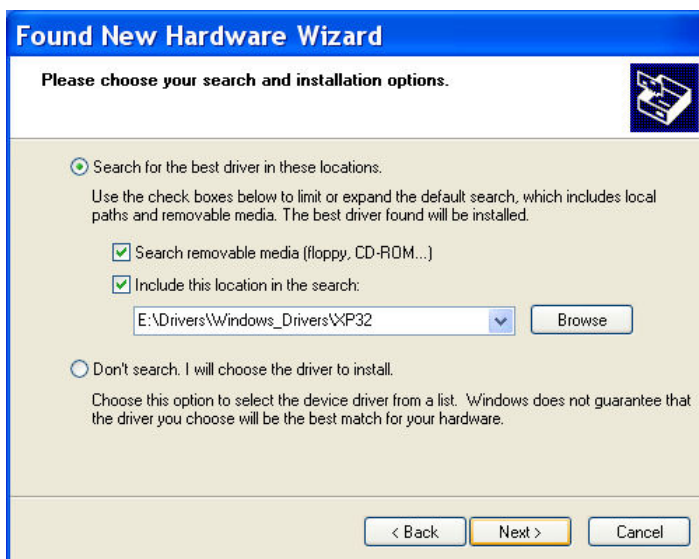
7. Click **Next**.

8. Please wait while the wizard searches for the GSM Modem. This window only appears briefly.
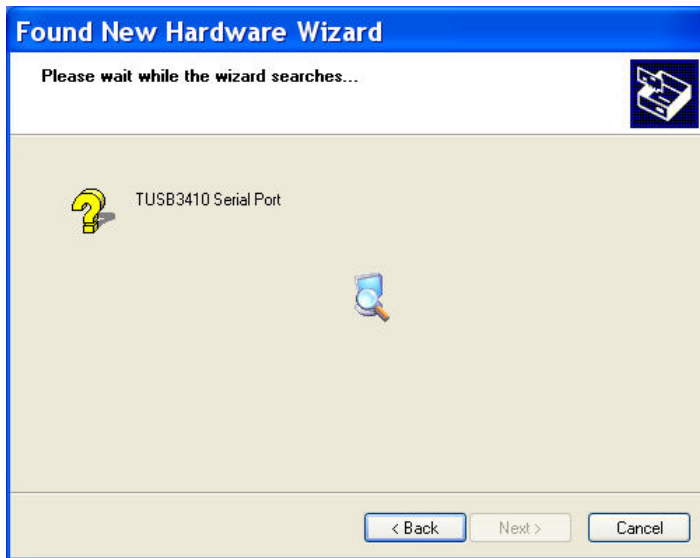
9. Please select the best match for your hardware for the list below.
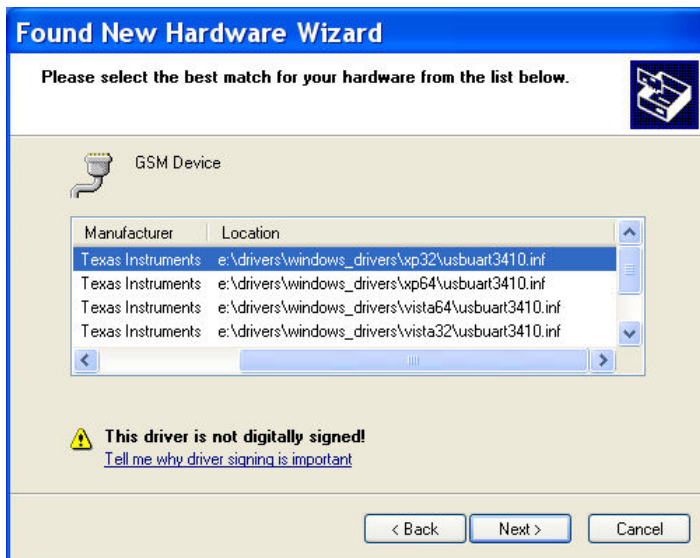
10. Click **Next.**

11. A Windows Logo Testing window appears.

12. At the Completing the Found New Hardware Wizard – GSM Device window.
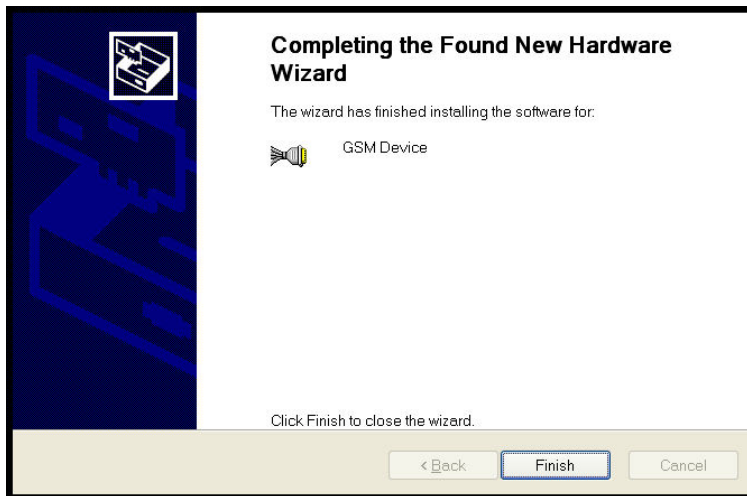
Click **Finish**. Installation of the USB driver is now complete.

Installing the Modem Driver

1. If the Welcome to the Found New Hardware Wizard window asking – Can Windows connect to Windows update to search for software? appears again.
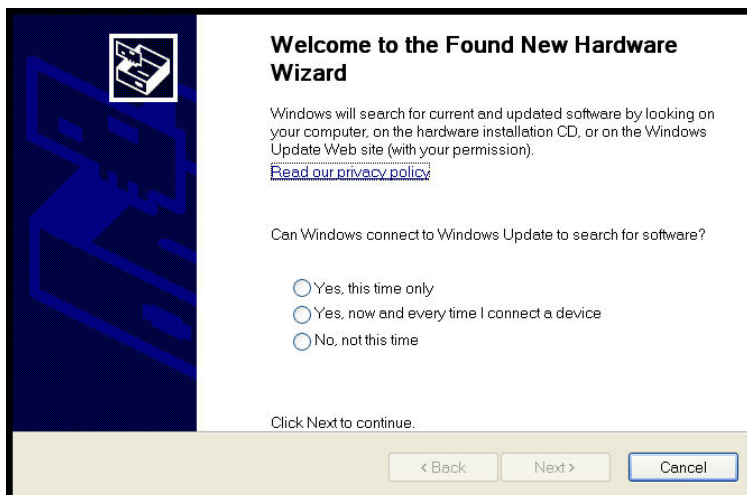
2. Select **No, not this time** and then click **Next.**

3. The *Found New Hardware Wizard* window appears for the **MultiTech GSM Modem**.

4. Select the **Install from a list or specific location (Advanced)** radio button. Then click **Next**.

The Please choose your search and installation options window appears.
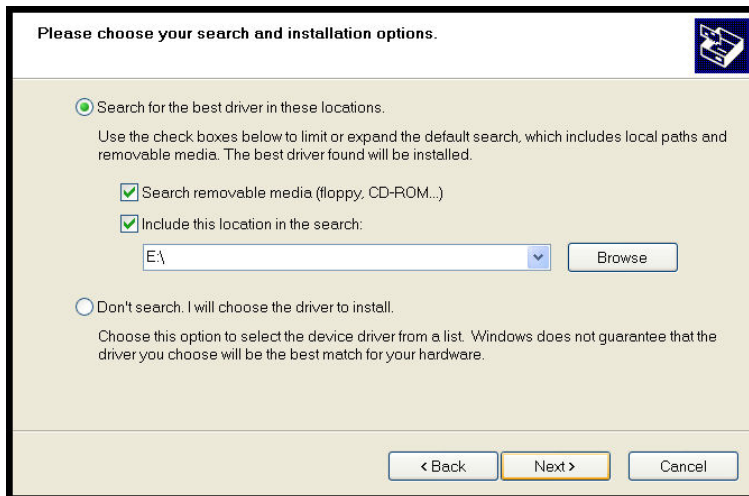
5. Select the **Include this location in the search is selected** check box. Click **Browse**.

6. Browse to the **Drivers** folder on your computer where you stored the driver you downloaded. Then select one of the following:

- If installing on a 32-bit operating system, select the location of the Vista32 driver.

- If installing on a Vista 64-bit operating system, select the location of the Vista64 driver.
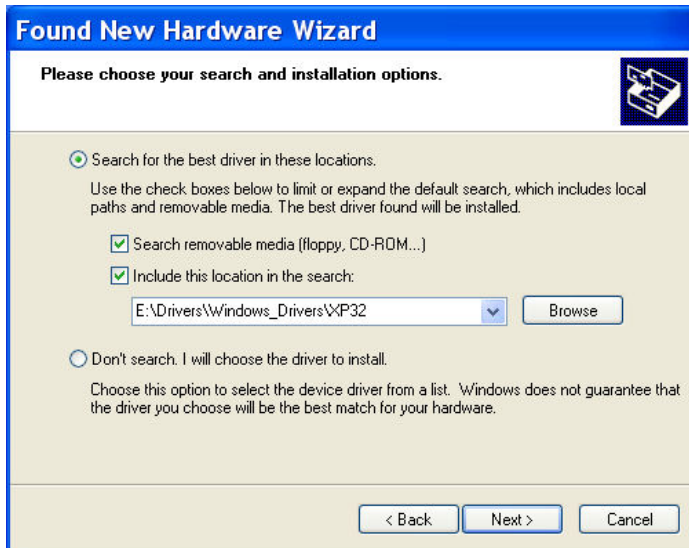
7. Click **Next**. The Please wait while the wizard searches for the GSM Modem message appears.

8. The Please select the best match for your hardware from the list below message appears:
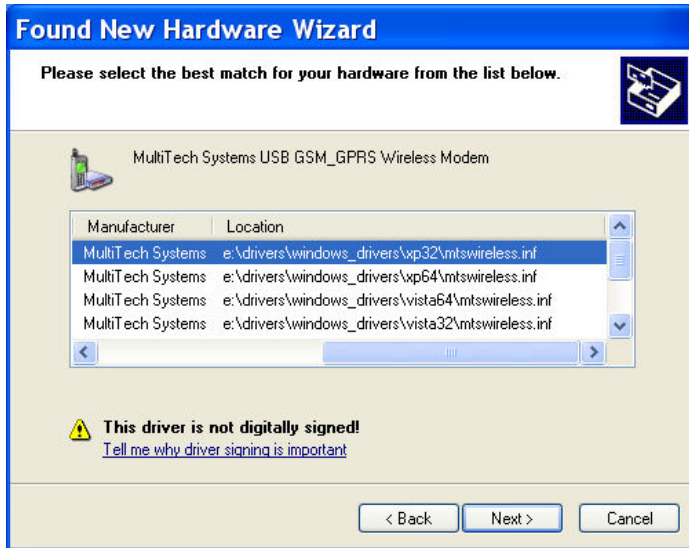
9. The final Windows Logo Testing window may appear depending on operating system settings. This window pertains to the creation of a modem entity in the operating system that accommodates the wireless USB MultiModem.
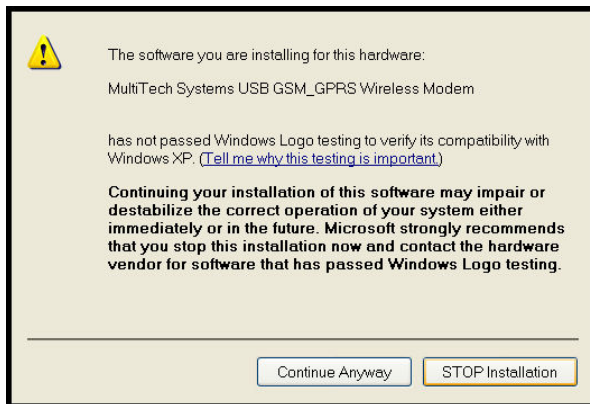
10. Click **Continue Anyway**. The Completing the Found New Hardware Wizard window appears.
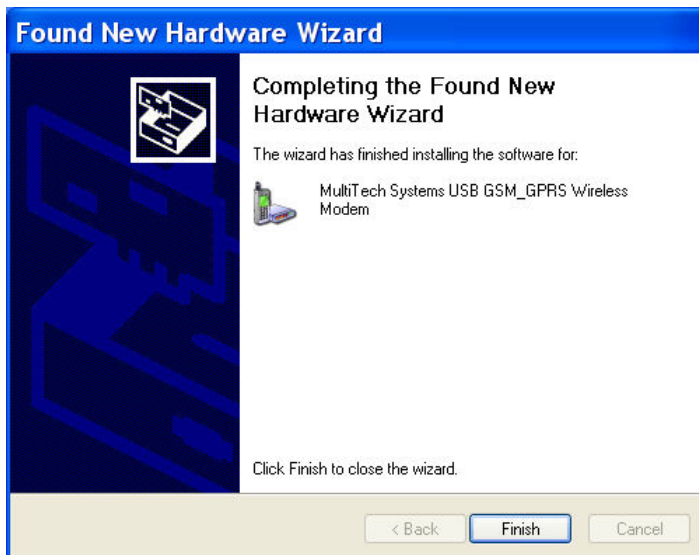
11. Click **Finish**.

   With the modem .inf file successfully installed, the entire software installation procedure for the MultiModem is complete.

Chapter 3 – Using Your Wireless Modem

Changing the GPRS Band

All MultiModem GPRS-F4 wireless modems support quad band (850/1900/900/1800 MHz). In reality, they operate like dual, dual-band modems. In other words, they can be configured for 850/1900 or 900/1800 MHz. They do not automatically seek the local area frequency.

Band Options Overview

The GPRS-F4 wireless modems can be ordered with a default band of 850/1900 MHz or 900/1800 MHz.

850/1900 MHz – The wireless modem defaulting to 850/1900 MHz is identified with F4 in the product ordering number. Example: MTCBA-G-F4. This build option is most commonly used in North American.

900/1800 MHz – The wireless modem defaulting to 900/1800 MHz is identified with F4-ED in the product ordering number. Example: MTCBA-G-F4-ED. This build option is most commonly used in Europe.

Changing the GPRS Band

If you want to change the band—because, for example, you are changing the geographical area in which you use your modem—use the **+WMBS** AT Command.

To change the GPRS band:

1. To open HyperTerminal, click **Start**. Then select **Programs** > **Accessories** > **Communications** > **HyperTerminal**.

2. When the command window opens, type **AT+WMBS=<Band><Param>**.

   where **<Band>** can be**:**

   4 = Dual-band mode 850/1900MHz

   5 = Dual-band mode 900/1800MHz

   where **<Param>** can be:

   0 = The modem will have to be reset to start on the specified band(s). This is the default.

   1 = The modem restarts immediately on the specified band(s).

3. Press **Enter**. For example:

   AT+WMBS=4,0. Press **Enter**.

Determining the Phone Number for the Wireless Modem

Every wireless modem will have its own unique phone number. The wireless modem's phone number may simply be told to the subscriber or be on the SIM. Wireless provider implementations may vary.

Examples of Useful AT Commands

Using HyperTerminal

In order to verify signal strength and roaming status, you must use a terminal application such as HyperTerminal. To open this program in Windows XP, go to **Start > All Programs > Accessories > Communications > HyperTerminal**. Other Windows operating systems have similar paths to HyperTerminal. See your system's online Help if you cannot find it.

Using AT Commands

AT commands can be used to operate, configure, and query your modem. You can find a reference guide to the GPRS commands on the Multi-Tech website.

The following two commands let you query signal strength and roaming status.

Verifying Signal Strength

1.   Using HyperTerminal, type **AT+CSQ**

2.   The modem responds with the received signal strength (rssi).

     RSSI ranges from 0 to 31.

Signal Strength Verification – RSSI	
21 – 31	Exceptional
11 - 20	Average
0 - 10	Weak or Insufficient
99	No signal

3.   The modem responds with the channel bit error rate (ber).

     BER ranges from 0 to 7 (Seven is the highest error rate).

Checking Network Registration and Roaming Status

This section describes how to verify that the wireless MultiModem has been registered on the wireless network.

1.   Using HyperTerminal, type **AT+CREG?**

2.   The modem responds in one of the following ways:

Network Registration Verification	
Value	**Network Registration Status**
0,0	The modem is not registered on any network
0,1	The modem is registered on the home network
0,5	The modem is registered on a network and it is roaming

Note: If the modem indicates that it is not registered, verify the signal strength to determine if the problem is the strength of the received signal.

Checking the Modem's Identity

Use the **ATI** command (Note: This command is illustrated using the capital letter i after **AT**)

●   Type **ATI0** (Note: The command ends in a zero)

     The manufacturing data displays. For example: Wavecom Modem Multiband G850 1900

●   Type **ATI3**

      The software version displays. For example: 651_09gg...

●   Type **ATI6**

     Displays modem data features. For example: data rates, data modes, fax classes.

Establishing a Voice Call

To establish a voice call:

1. Enter PIN code, if your wireless provider requires one.

   a. Type **AT+CPIN=1234**

   b. Responses include:

   OK (PIN Code accepted)

   +CME ERROR : 16 (Incorrect PIN Code)

   +CME ERROR : 3 (PIN already entered [with +CMEE : 1 mode])

2. Initiate a voice call.

   a. Type **ATD1234;**   (Note: Don't forget the semicolon ";" at the end. This stands for *voice* calls)

   b. Responses include:

   OK (Communication established)

   CME ERROR : 11 (PIN Code not entered [with +CMEE : 1 mode])

   CME ERROR : 3   (Operation not allowed)

3. Initiate an emergency call.

   a. Type **ATD112;** (Note: Don't forget the semicolon ";" at the end. This stands for *voice* calls)

   b. Responses include: OK

4. Hang up.

   a. Type **ATH**

   b. Responses:OK

Establishing a Circuit-Switched Data (CSD) Connection

A Circuit-Switched Data Connection (CDC) makes the wireless modem work similar to a regular analog modem. You must have CSD service in order to make a CSD call.

Note: Your cellular provider charges airtime usage for these connections.

1. To establish a Connection:

   a. Open HyperTerminal or a terminal application.

   b. Type **ATD<phone number>**

Notes:

- The phone number you are calling is entered between the displayed brackets. Do not type additional brackets. For example, type only **ATD 8585551212**. **8285551212** between the brackets.

- This command tells the modem to inform the wireless network that you are initiating a CSD modem call. If you are dialing to another modem, the remote modem should answer and a connection between the two modems will be established. If you include a semi-colon (;) at the end of the dialing string, the modem will instead initiate a Voice call to the phone number dialed.

2. To disconnect:

   a. Type: **+++**

   b. Wait about two seconds to see an OK response.

   c. Type **ATH**

Note: +++ is the escape sequence and **ATH** is the Hang-up command.

Answering a Circuit-Switched Data (CSD) Connection

A Circuit-Switched Data Connection makes the wireless modem work similar to a regular analog modem. You must have CSD service in order to answer a CSD call.

There are three phone numbers for GSM: the voice number, the data number, and the fax number. All are provided by the carrier. To answer a call:

1. To establish a connection, call into the modem by dialing the data number provided by your carrier.

2. To answer a call, when you see the RING responses on the terminal screen, enter **ATA <cr>**.

3. To set auto-answer:

   a. Enter ATS0=x

      where **x** is the number rings

      This sets the modem to auto-answer. The call will be answered after the number of rings entered. .

   b. Then call into the number provided to you by the carrier.

4. To disconnect:

   a. Type **+++**

   b. Wait about one second to see an OK response.

   c. Type **ATH**

Using Short Message Services (SMS)

Sending a Short Message to a Specified Number
1. Type **AT+CMGS="8585551212" <press Enter>**

2. Then type your message: **Please call me soon. <press ctrl Z>**

3. The modem may respond with **+CMGS:<mr> OK**

Writing a Message to Memory
You can store a message to send it at a later date.

1. Type **AT+CMGW="8585551212" <press Enter>**

2. Type the message. **<press ctrl Z>**

3. The modem may respond with **+CMGW: 4 OK** (The message is stored in the index as message 4.)

Sending a Message from Storage
1. Type **AT+CMSS=x,"8585551212" <press Enter>**

2. The modem may respond with **+CMSS: 1 OK** (The transmission is successful. One SMS message is sent.)

Note: The *x* represents an index location.

Viewing a List of Stored Messages
1. Type **AT+CMGL=x <press Enter>**

   where x can be:

   REC UNREAD" Shows received unread messages.

   "REC READ" Shows received read messages.

   "STO UNSENT" Shows stored unsent messages.

   "STO SENT" Shows stored sent messages.

   "ALL" Shows messages.

2. The modem will respond AT+CMGL: 1,"REC UNREAD","8585551212",1...

3. The modem will continue until all UNREAD messages, numbers, and index number are listed.

Reading a Stored Message
1. Type **AT+CMGR=*x* <press Enter>**

   where x is an index location

2. The modem may respond with +CMGR: "REC READ", "8585551212", ...

Deleting a Stored Message
1. Type **AT+CMGD=*x,n* <press Enter>**

   where n can be:

   0 Delete message at location <include the index number>

   1 Delete all READ messages.

   2 Delete all READ and SENT messages.

3 Delete all READ, SENT, and UNSENT messages.

4 Delete ALL messages.

If you want to delete one message at a time, do not enter a value for **n**.

2. The modem will respond **OK.**

Note: The **x** represents an index location. The **n** stands for the type of messages to delete.

SMS Examples

Send Example

Send an SMS message to another SMS compatible device

at+cmgf=1 (set to text mode)

OK

at+cpms="SM","SM" (set memory storage when writing and sending SMS messages)

+CPMS: 0,50,0,50

OK

at+cmgs="7632273726" (send message to the number specified in quotes)

> TEST message ONE. (Type message after the > symbol and hit <CTRL + Z> to send the message)

+CMGS: 52

OK

Receive Examples

Receive Example 1: Receive SMS messages in text mode by saving to SIM memory – Notification via +CMTI unsolicited response code:

at+cmgf=1 (set to text mode)

OK

at+csms=0 (set to Phase 1)

+CSMS: 1,1,1

OK

at+cnmi=2,1,0,0,0 (set to display +CMTI indication when SMS is received)

OK

at+cpms="SM","SM" (set the read and write storage of SMS to SIM)

+CPMS: 0,50,0,50

OK

+CMTI: "SM",1 (indication that message was received and stored to SIM location 1)

at+cmgr=1 (read message stored in location 1)

+CMGR: "REC UNREAD","+17632273726",,"06/03/17,13:55:22+00"

TEST1

OK

at+cmgd=1 (delete message that is stored in location 1)

OK

Receive Example 2: Receive SMS message in text mode by directly routing the received message to the TE through the serial port using Phase 2:
at+cmgf=1 (set to text mode)

OK

at+csms=0 (set to Phase 2)

+CSMS: 1,1,1

OK

at+cnmi=2,2,0,0,0 (set to receive SMS and route directly to TE)

OK

+CMT: "+17632273726",,"06/03/17,13:59:18+00" (message received and directly routed to TE)

TEST2

Receive Example 3: Receive SMS message in text mode by directly routing the received message to the TE through the serial port using Phase 2+:
at+cmgf=1 (set to text mode)

OK

at+csms=1 (set to Phase 2+)

+CSMS: 1,1,1

OK

at+cnmi=2,2,0,0,0 (set to receive SMS and route directly to TE)

OK

+CMT: "+17632273726",,"06/03/17,14:01:17+00" (message received and directly routed to TE)

TEST3

at+cnma (acknowledge that message has been received)

OK

Setting up Internet Access

You can setup Internet access in Windows Dial-Up Networking (DUN) of the computer that the wireless modem is serving. Setup procedures vary according to the type of wireless service provider used.

To access Dial-Up Networking on your PC, from the **Start** button, **select Settings > Network Connections**.

- For GSM-without-GPRS, a circuit-switched data connection is used. The user can set up DUN to make a conventional V.32 modem connection to any terminating modem at the other end. The phone number specified in DUN can be one supplied by the wireless service provider or another phone number related to a different dialup modem service (e.g., a dialup modem service phone number from any commercial or private dialup network).

- For GSM-with-GPRS, a single DUN number is generally used by all of a wireless provider's subscribers throughout its area of coverage; regional, nationwide, continental, etc. Rather than being a literal phone directory number, as in conventional DUN, this is a code that gives the modem Internet access.

Connecting to the GPRS Network for Internet Access

After you have inserted the SIM card and the modem is ready for use, you can establish an Internet connection through a Windows dial-up session.

Note that your wireless provider will charge you for data usage.

Before you Begin

Before you begin, please note the following.

- The GPRS modem has an active SIM card and must have GPRS services

- The modem must be getting a proper signal and be showing a network registration through the wireless provider's network

- You must have a PC running Windows Vista, XP, or 2003 with the Multi-Tech drivers installed for your particular model

- The following instructions are for Windows XP SP2 and Windows 2003. Every PC may have slight differences which may cause the instructions to be different. Use these instructions as a guide to help you understand what is required to set up an Internet connection through your wireless service provider for all operating systems.

- Cellular providers provide Internet services as part of your service plan. Multi-Tech recommends that if you plan on using large amounts of data, to sign up for an unlimited data service plan with your provider. Multi-Tech Systems, Inc. will not be responsible for any charges on your cellular bill. If you have any questions about billing, service plans, service charges, etc., please contact your provider for more information.

Setting the Access Point Name (APN)

So that your GPRS wireless modem can connect to your provider's network, you must tell the modem the Access Point Name (APN) to which it will connect. The APN is a server name that your account is setup on with your provider. Your provider gives you the APN. Well-known APNs include:

- AT&T: PROXY, or INTERNET, or PUBLIC

- T-Mobile: INTERNET2.VOICESTREAM.COM, or INTERNET3.VOICESTREAM.COM, or WAP.VOICESTREAM.COM

- Rogers AT&T of Canada: INTERNET.COM

To set the APN:

1. From the **Start** button, select **Control Panel**.

2. In the Control Panel, double-click **Phone and Modem Options**.

3. The Phone and Modem Options window appears. Select the **Modems** tab.

4. On the Modems tab, select the Multi-Tech wireless modem listed in the table and click **Properties**.

5. A Properties window for your modem opens. Select the **Advanced** tab.

6. From the Extra Settings group, in the **Extra initialization commands** text box, type:

   AT+CGDCONT=1,"IP","<APN>"

   where <APN> is the correct APN for your account.

   For example:

   AT+CGDCONT=1,"IP","ISP. AT&T"

7. Click **OK** to close the modem Properties window.

8. Click **OK** to close the Phone and Modem Options window.

Creating Your Dial-Up Connection in Windows Vista, XP, 2003, and 2000

1. From the **Start** button, select **Control Panel**.

2. In the Control Panel, double-click **Network Connections**. The Network Connections window opens.

3. In the Network Tasks group, select **Create a new connection**.

4. The New Connection Wizard opens. The wizard helps you setup your Internet connection. Click **Next**.

5. On the Network Connection Type window, select **Connect to the Internet**, and click **Next** .

6. On the Getting Ready window, select **Set up my connection manually**, and click **Next**.

7. On the Internet Connection window, select **Connect using a dial-up modem**. Click **Next**.

   Note: After clicking on **Next**, you may or may not be asked to select which modem to use. If you have more than one modem installed in your PC, you will be required to select the proper modem to use. If asked, please select the Multi-Tech wireless modem that has been installed.

8. On the Connection Name window in the ISP Name box, type a name for your new connection. Click **Next** .

9. On the Phone Number to Dial window, type in the number that specifies to the modem to connect to your provider's Internet service.

   For GPRS modems, type ***99***1#**. Then click **Next**.

10. On the Connection Availability window, specify if this connection is for anyone's use or for your use only by checking the appropriate button. Click **Next**.

11. On the Internet Account Information window, type the user name and the password for your account. In many cases, a user name and a password are not required, but some wireless providers require it. Check with your provider to see if they are needed.

    Check the following two options if you would like them activated:

    - Check the box if you want this account name and password to be used by everyone.

    - Check the box if you want this as your default Internet connection. Then click **Next**.

12. On the Completing the New Connection Wizard window, you last task is to place a check in the box if you would like to add a shortcut to your desktop. Then click **Finish**.

13. A Connection window displays on your desktop. Click the **Properties** button on the bottom of this window.

14. The Properties window will open for you to make your connection. **Important:** Make sure that *Use dialing rules* is not selected, and then click **OK**.

15. Once back at your Connection window, click the **Dial** button at the bottom of the window to start the connection.

16. The connection will now tell the modem to connect to your provider's Internet service. Once connected, the connection status icon appears in the system tray.

Disconnecting

1. To disconnect, right click on the connection icon in the system tray.

2. Select **Disconnect**.

Chapter 4 – Troubleshooting and Frequently Asked Questions

Troubleshooting Examples

Before calling the Multi-Tech Technical Support, check the following connections:

- The right antenna is connected to the modem

- The serial cable connection is correct

- The power is connected correctly and the power lights on the modem are on

- Verify your signal strength

- Verify your network registration

- Use the following situation examples to troubleshoot the modem not answering and the modem returning a *No Carrier* message.

Situation A: The modem does not answer

If the wireless MultiModem does not answer through the serial link upon an attempted transmission of data or voice signals, see the table below for possible causes and solutions.

Solutions for 'no connection through serial link' situation		
If the modem returns …	**Then ask …**	**Action**
(nothing)	Is the communication program properly configured?	In communications program, verify that modem parameters have been set to the values shown here: Data bits = 8 Parity = none Stop Bits = 1 Baud = 115200 bps
	Is another program interfering with the communication program?	Close any such application program.
	Is the modem set to autoanswer?	Type **ATS0=1** (to set to auto answer on the first ring) Type **ATA** (to set to manual answer)
	Is the communication program receiving RING responses?	Type **ATS0=1** (to set to auto answer on the first ring) Type **ATA** (to set to manual answer)

Situation B: The modem always returns «No carrier» when trying to originate a call

Solutions for "no carrier" message		
If the modem returns …	*Then ask …*	*Action*
no carrier *(esp. for data communication)*	Is the selected bearer type supported by the called party? Is the selected bearer type supported by the network?	Type AT+CEER to view the extended error code (see "Error Results Codes" in the AT Command guide). Be sure that the selected bearer type is supported by the called party. Be sure that the selected bearer type is supported by the network. If no success, try bearer selection type: AT+CBST=0,0,3 Be sure SIM card is available for data/fax calls.
no carrier *(esp. for voice communication)*		Be sure that the semicolon character (";") is typed immediately after the phone number in the AT command; e.g., ATD#####;

Frequently Asked Questions

Which providers can I use?

- Two major providers are T-Mobile and AT&T.

Does this modem support High-Speed Circuit-Switched Data (HSCSD)?

- No, our GSM/GPRS modems do not support HSCSD.

- The modem is answering, but seems to not be doing anything?

- The modem is answering in voice mode.

- If you are trying to make a data call, make sure the account has CSD service. You will also need the data number (separate number from the main phone number that is provided by the provider).

I am trying to make a data connection by dialing from my wireless modem to an analog modem. Why does the analog modem answer and send tones, but never connect?

- To make a data call you must use the ATD<number> command.

- Make sure the account has CSD service.

How do I get the voice portion to work so I can talk to others using the wireless modem?

- You will need a cable that has the speaker pins connected to a speaker and microphone.

- We have a "Y" cable that splits out to a RJ9 connector that can be used to plug into the receiver of a handset.

- 'ATD<number>;' will originate a voice call.

How do I make an Internet connection to my dial-up ISP?

- Make sure you have CSD service.

- Create a dial-up connection to the ISP's access number, then use your account username and password and choose the wireless modem as the device.

How does faxing work?

- GPRS modems support Class 1 and Class 2 Group 3 faxing.

- You will need fax services setup on your account. You should receive a separate phone number for fax just like voice and data, and you must call the fax number for the modem to receive a fax.

- You will also need fax software (we do not have working software). WinFax Version 10 has been tested with success.

I can't make outgoing calls. I just receive a NO CARRIER response.

- Make sure the antenna is connected and SIM is inserted correctly.

- Check signal and registration: 'AT+CSQ' (10-31 is good), 'AT+CREG?' (0,1 is registered & 0,5 is roaming).

- Check NO CARRIER reason with 'AT+CEER'. Look up error code in Reference Guide.

The modem will not answer.

- To have modem autoanswer, set modem with 'ATS0=1' and 'AT&W' to store the setting.

- Send 'ATA' to the modem once the RING is indicated on the terminal screen.

- You may need to set modem to ignore DTR, 'AT&D0', if you aren't providing DTR.

I am trying to make a GPRS connection using a Windows dial-up session. It connects and then immediately disconnects.

- Make sure the APN is configured in the modem correctly (The APN is provided by the provider).

- Check the APN with 'AT+CGDCONT?' To make sure it is correct.

- If no APN is inserted, then insert the correct APN using the command 'AT+CGDCONT=1,"IP","<APN>"' with HyperTerminal or add it into the "Extra Initialization Commands:" in the modem's properties.

- Make sure the APN is correct for your account.

When I try to establish a GPRS connection using Windows dial-up I get an error: "Hardware Failure".

- Check the modem to make sure it is installed and can be queried in the modem's properties.

- Make sure the com port is not being held by another application. Look for the TR light indication. If it is on, most likely another application is holding onto the port.

- Make sure the dial-up connections maximum speed matches the modem's properties maximum port speed.

- Try rebooting the PC.

What is the maximum amount of characters I can use to send an SMS message?

- Supports up to 160 characters maximum.

- In PDU mode using 7-bit, the modem still supports 160 characters, but in 8-bit the modem will support only 70 characters.

After changing the +CNMI, +CSCA, or +CSMP command values, the modem doesn't store them.

- When changing these command values, you must use the +CSAS command to store the changes.

How do I send an SMS message to an email account?

- When sending an SMS message to an email account, you must use a designated routing number that will tell the SMS server to route your message to an email account. Here are the numbers that we are aware of at this time:

  AT&T = "0000"

  T-Mobile = "500"

  Here is an example of how to send an SMS message to an email account:

  AT+CMGS="0000"

  > email@multitech.com My message goes here. <ctrl +Z>

Appendix A - Environmental Information

Waste Electrical and Electronic Equipment (WEEE)

The WEEE directive places an obligation on EU-based manufacturers, distributors, retailers and importers to take-back electronics products at the end of their useful life. A sister Directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

REACH Statement

Registration of Substances:

After careful review of the legislation and specifically the definition of an "article" as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1(a)(b), it is our current view Multi-Tech Systems, Inc. products would be considered as "articles". In light of the definition in § 7.1(b) which requires registration of an article only if it contains a regulated substance that "is intended to be released under normal or reasonable foreseeable conditions of use," our analysis is that Multi-Tech Systems, Inc. products constitute nonregisterable articles for their intended and anticipated use.

Substances of Very High Concern (SVHC):

Per the candidate list of Substances of Very high Concern (SVHC) published October 28, 2008 we have reviewed these substances and certify the Multi-Tech Systems, Inc. products are compliant per the EU "REACH" requirements of less than 0.1% (w/w) for each substance.

If new SVHC candidates are published by the European Chemicals Agency, and relevant substances have been confirmed, that exceeds greater than 0.1% (w/w), Multi-Tech Systems, Inc. will provide updated compliance status.

Multi-Tech Systems, Inc. also declares it has been duly diligent in ensuring that the products supplied are compliant through a formalized process which includes collection and validation of materials declarations and selective materials analysis where appropriate. This data is controlled as a part of a formal quality system and will be made available upon request.

Restriction of the Use of Hazardous Substances (RoHS)

Multi-Tech Systems, Inc.

Certificate of Compliance

2002/95/EC

Multi-Tech Systems, Inc. confirms that this product now complies with the chemical concentration limitations set forth in the directive **2002/95/EC** of the European Parliament (Restriction Of the use of certain Hazardous Substances in electrical and electronic equipment - **RoHS**)

These Multi-Tech Systems, Inc. products do not contain the following banned chemicals:

Lead, [Pb] < 1000 PPM

Mercury, [Hg] < 1000 PPM

Hexavalent Chromium, [Cr+6] < 1000 PPM

Cadmium, [Cd] < 100 PPM

Polybrominated Biphenyl, [PBB] < 1000 PPM

Polybrominated Diphenyl Ether, [PBDE] < 1000 PPM

Notes:

1. Lead usage in some components is exempted by the following RoHS annex; therefore, higher lead concentration could be found.

    a. Lead in high melting temperature type solders (i.e., tin-lead solder alloys containing more than 85% lead).

    b. Lead in electronic ceramic parts (e.g., piezoelectronic devices).

China ROHS

依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP)

标准 - 中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国

RoHS，下表列出了 Multi-Tech Systems Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS)

的名称及含量水平方面的信息。

成分名称	有害/有毒物质/元素					
	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
IC	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LED	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006
限量要求。

O 表示不含该物质或者该物质的含量水平在上述限量要求